REMARKS

Applicant respectfully requests the Examiner to acknowledge this application's priority claim under 35 U.S.C. § 119. The present application is a continuation of a parent application filed on February 12, 1993. The parent case includes a certified claim for priority back to several priority applications filed in the Japanese Patent Office, the earliest of which was filed at the JPO on February 14, 1992. Perfection of the priority claim in the parent application also perfects the priority claim in the present continuation application.

In accordance with the Examiner's request, Applicants have amended the specification to incorporate a reference to the parent application. This amendment, however, merely confirms the amendment appearing at item no. 8 of the request for a continuation application.

Applicant has amended pending claims 47-50 to correct minor informalities and improve readability thereof. Applicant also has added new claims 51-59, to round out the coverage to which Applicant is entitled.

Applicant respectfully traverses the § 102(b) rejection of claims 47-50 over Moyer '586. Pending claims 47-50 are directed to an embodiment of the present invention depicted, *e.g.*, in Figs. 27-54, and disclosed at page 98, line 3, *et. seq.* As set forth, *e.g.*, in claim 47, a compensating rule for determining a compensating value U for adjusting the working condition of a working machine, disclosed to be in the form of grinding machine 110, is changed depending upon whether the "frequency of a variation in time of successive measurement of actual dimensions of workpieces" processed by the working machine is higher than a threshold value. The "variation" may be a predetermined form of a change of the measured dimensions, such as an unstable or

abrupt change of the measured values. For instance, "the frequency of a variation" is higher than the threshold when the number of changes (consecutive or intermittent changes) per unit time is larger than a threshold, as explained below in detail. Claim 47 recites, in particular, determining means for determining a compensating value for adjusting the working condition of the working machine, for the workpiece to be processed subsequently (1) on the basis of the actual dimensions of the working portions of the workpieces which have been measured by the measuring device, and (2) according to a compensation rule, which changes such that the compensating value to be determined is less responsive to a change in the actual dimensions of the processed workpieces when the frequency of a variation in the time of measurement of the actual dimensions successively obtained by the measuring device is higher than a threshold value, while the compensating value to be determined is more responsive to the change in the actual dimensions when the frequency is equal to or lower than the threshold value. Claim 50 recites a step of determining the compensating value, which corresponds to the determining means recited in claim 47.

Moyer '586, in contrast, discloses coiler system 10 for manufacturing a coil spring 32, which is adapted to "adjust pitch tool 30 to ensure that the next spring will be manufactured closer to the desired mean or free length" (col. 7, lines 20-25), as noted by the Examiner. Each time the spring 32 is manufactured, its length X_c (col. 8, lines 31-32) is obtained on the basis of the output of measuring device (probe) 36. Pitch adjustment value to adjust the pitch tool 30 is calculated on the basis of the obtained length X_c, closure rate and correction value (col. 11, lines 29-36). If the length X_c is greater than the three-sigma value (maximum allowable spring length), the pitch

adjustment value is calculated on the basis of the three-sigma value, closure rate and correction value (col. 11, line 68 through col. 12, line 8). Moyer discloses that "the adjustment value is based on the statistical distribution of the population of a predetermined number of previously produced workpieces" (col. 4, lines 34-36), and further teaches that "the dimension of the current workpiece is compared with the expected value and the correction value is modified according to the comparison" (col. 4, lines 41-44). The concept of the "distribution of the population of a predetermined number of previously produced workpieces" according to Moyer '586 is embodied by the use of two different equations (cols. 11 and 12) to calculate the pitch adjustment value, depending upon whether the value X_c is greater than the three-sigma value or not. Although the three-sigma value is determined by the previously obtained values XC, this three-sigma value is merely used to limit the pitch adjustment value or "to avoid making an excessive adjustment from a probably non-normally distributed workpiece" (col. 12, lines 4-6).

The three-sigma value is distinct from "a frequency of a variation in a time of measurement of the actual dimensions successively obtained," as recited in claims 47-50, which is introduced to permit the compensating value to be suitably responsive to the actual change in the dimensional error of the workpieces. According to the compensating apparatus and method of claims 47-50, the compensating value is determined by taking into account the frequency of variation in time of measurement of the actual dimensions of the successively processed workpieces, so that the working condition of the working machine can be estimated on the basis of the frequency of variation, before the measured values largely deviate from the nominal values. Thus,

the determined compensating value accurately estimates the actual working condition, to improve the dimensional accuracy of the processed workpieces.

In this respect, applicant incorporates by reference the arguments presented in the Supplemental Reply Brief filed in the parent case, related to claims 39 and 42.

Specifically, although the three-sigma value of Moyer '586 is updated, the concept of the three-sigma value is distinct from the claimed "frequency of a variation in time of measurement" of the present invention. The "three-sigma value" is calculated irrespective of the order in which the spring length values are obtained. To the contrary, the "frequency of a variation" of the present invention is calculated by taking into account the order in which the actual dimensions X of the workpieces are successively obtained by the measuring device. The three-sigma value represents a correlation between the magnitude and frequency of the measured values X_c, while the "frequency of a variation" represents the number of variations of the dimensions measured in the predetermined order during a given period of time, for example.

Referring to Figs. A1-A3 and B1-B3 of an Appendix enclosed herewith, there are illustrated two examples of measured values (taken along the vertical axis) which change with the time (taken along the horizontal axis). In these examples, the frequency distributions of the measured values are shown in the graphs of FIG. A2 and B2, wherein the magnitude of the measured values is taken along the horizontal axis while the frequency of the measured values is taken along the vertical axis. The "three-sigma value" of Moyer corresponds to the frequency distributions of FIGs. A2 and B2. It will be understood that the group of measured values of FIG. A1 and the group of

measured values of FIG. B1 have the same frequency distribution, that is, the same "three-sigma value".

However, the two groups of measured values of FIG. A1 and FIG. B1 have respective different "frequencies of a variation", as is apparent from the graphs of FIG. A3 and FIG. B3 wherein the time is taken along the horizontal axis while the "frequency of a variation" represented by the number of changes of the measured values is taken along the vertical axis. In the case of FIG. A1, the measured values involve three consecutive times of increase, and three consecutive times of decrease after a non-change period therebetween. In the case of FIG. B1, the measured values involve three times of increase each following a non-change period. One-dot chain lines in FIGs, A3 and B3 indicate an example of a predetermined threshold value "4" of the frequency above which the compensating value to be determined according to the compensation rule is less responsive to a change in the actual dimensions of the processed workpieces. In the case of FIG. A3, a determination that the frequency is higher than the threshold value is made. In the case of FIG. B3, on the other hand, this determination is not made, the Examiner's attention is directed to the fact that Moyer '586 fails to teach the concept of the "frequency of a variation" shown in FIGs. A3 and B3. It is noted that FIGs. A3 and B3 substitute for Figs. 1(c) and 2(c) attached to the Supplemental Reply Brief filed in the parent case.

In Moyer '586, the pitch adjustment value is determined in different manners depending upon whether the current spring length X_c falls within the range of the three sigma value calculated from the last twenty-one spring length values, or outside the range, that is, depending upon whether "the absolute of the current spring length XC is

greater than the maximum allowable spring length or is outside of the three sigma points" (col. 11, last line through col. 12, line 2). In contrast, the compensating value according to the present invention is determined in different manners depending whether the "frequency of a variation in time of measurement of said actual dimensions" is "higher than a threshold value" or "equal to or lower than the threshold value". Moyer '586 does not change the manner of determining the compensating value (pitch adjustment value) depending upon whether the width of the three sigma range is larger or smaller than a predetermined threshold, but instead change the manner depending upon whether the current spring length X_c is within the three-sigma range or not. This manner of determining the compensating value according to Moyer et al. is different from the manner of determining the compensating value according to the present invention, which depends upon whether or not the frequency of a variation in time of measurement of the actual dimensions is higher or not higher than the threshold value.

According to the description in columns 11 and 12 of Moyer '586, when the current spring length value X_c is within the three-sigma value, the current compensating value (pitch adjustment value) is calculated according to a normal rule using the current spring va1ue X_c, that is, calculated as (Xc x adjustment multiplier). When the current spring length value X_c is not within the three-sigma value, the current compensating value or adjustment value (new) is calculated according to a modified rule using the three-sigma value in place of the current spring length value X_c, that is, calculated as ($S\sigma$ x adjustment multiplier). In Moyer '586, the same adjustment multiplier is used irrespective of whether the currently measured value X_c is within the three-sigma range or not. When the currently measured value X_c is within the three-sigma range, this

value X_c is used to determine the current compensating value. When the value X_c is outside the three-sigma range, the three-sigma value is used, in place of the current value X_c, to determine the compensating value, for avoiding deterioration of the compensating accuracy due to an influence of the current value X_c which is considered abnormal. The adjustment multiplier is calculated as closure rate x correction value/255. The closure rate is the setting of switch 82, while the correction value is the setting of potentiometer 70 (col. 11, line 67 through col. 12, line 2). The closure rate and correction value are both entered or specified by the machine operator, and are not automatically determined by a computer.

For at least the reasons discussed above, Moyer '586 cannot anticipate claims 47-50. The § 102(b) rejection of these claims, therefore, is unsupportable and should be withdrawn.

New claims 51-59 further patentably distinguish the present invention from Moyer '586. The reference fails to disclose at least a working system wherein the means for determining the compensating values updates the compensating value from time to time on an intermittent basis while the workpieces are measured successively by the post-process measuring device, as recited, *e.g.*, in new claim 51. The reference also fails to disclose that the determining means updates the compensating value, such that the compensating value is changed from a last value to a present value only after a first one of the processed workpieces adjusted by the last value has been measured, whereby the compensating value is not updated for a period after the last value is determined before the first one of the workpieces has been measured, as recited. *e.g.*, in new claim 52. In the system of Moyer '586 the workpiece in the form of a spring 32 is measured

immediately after the spring is formed and there are no pre-measured workpieces. Thus, the system disclosed in the reference does not suffer from the problem solved by claims 51-58, and does not require means for solving the problem solved by the system of claims 51-58.

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: July 1, 2004

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Attachments: Appendix consisting of Figs. A1-A3 and Figs. B1-B2

APPENDIX

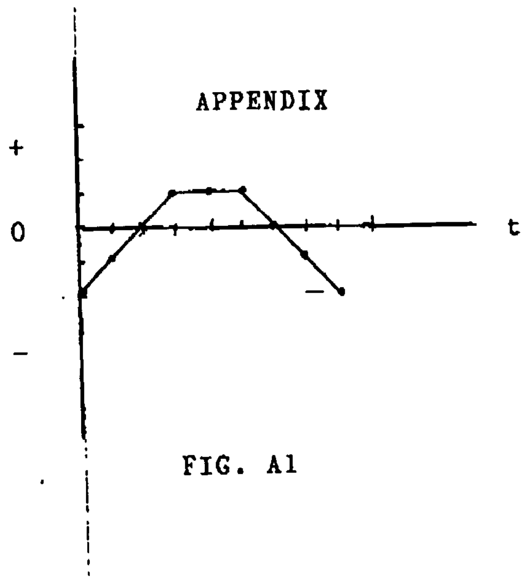

FIG. A1

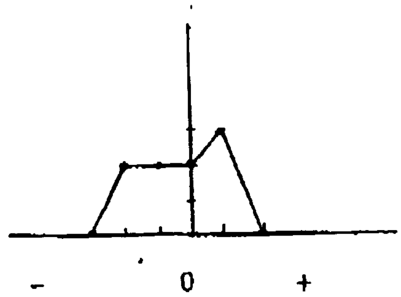

FIG. A2

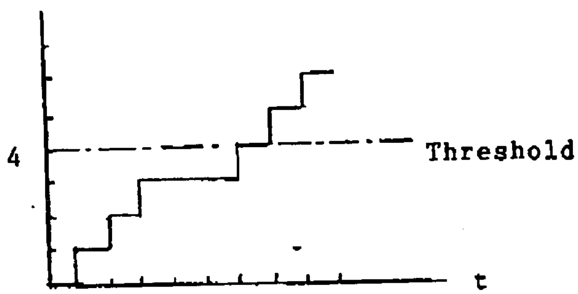

FIG. A3

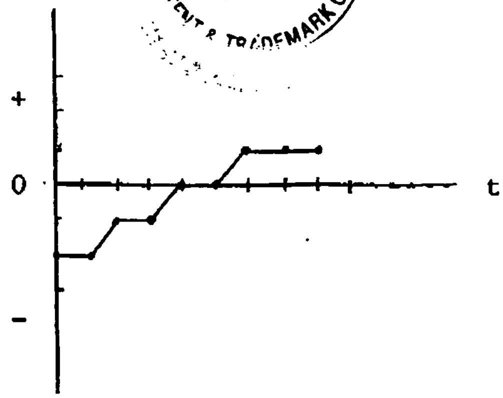

FIG. B1

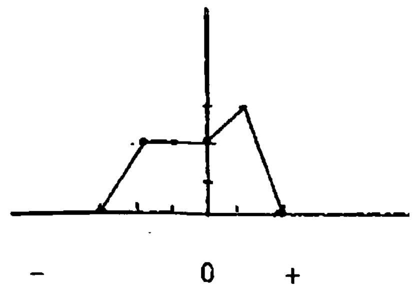

FIG. B2